What is claimed is:

1   1. A method of organizing a plurality of members in a primary-backup group in a
2   clustered computer system, the method comprising:
3   forming a primary subgroup including at least one member from the
4   plurality of members, wherein each member in the primary subgroup has access to
5   a common primary resource; and
6   forming a backup subgroup including at least one member from the
7   plurality of members, wherein each member in the backup subgroup has access to
8   a common backup resource.

1   2. The method of claim 1, further comprising communicating group state
2   information between the plurality of members, the group state information identifying the
3   resources managed by the primary-backup group.

1   3. The method of claim 1, further comprising selecting a primary host member
2   for the primary resource from the primary subgroup, and selecting a backup host member
3   for the backup resource from the backup subgroup.

1   4. The method of claim 3, further comprising communicating group state
2   information that identifies the primary and backup host members between the plurality of
3   members.

1   5. The method of claim 3, further comprising communicating resource
2   configuration data for the primary resource from the primary host member to any other
3   member of the primary subgroup, and communicating resource configuration data for the
4   backup resource from the backup host member to any other member of the backup
5   subgroup.

1   6. The method of claim 3, wherein the primary and backup resources each

2 comprise a storage device, the method further comprising, sending a message from the

3 primary host member to the backup host member in connection with initiating mirroring

4 from the primary host member to the backup host member.

1   7. The method of claim 1, further comprising forming a second backup subgroup

2 including at least one member from the plurality of members, wherein each member in

3 the second backup subgroup has access to a common second backup resource.

1   8. The method of claim 1, wherein each of the primary and backup resources is

2 selected from the group consisting of storage devices and imaging devices.

1   9. A method of joining a member to a primary-backup group in a clustered

2 computer system, the method comprising:

3   determining to which of a plurality of resources managed by the primary-

4   backup group the joining member has access, the plurality of resources including

5   a primary resource and at least one backup resource; and

6   adding the joining member to a subgroup for a resource among the

7   plurality of resources to which the joining member has access, wherein the

8   subgroup is among a plurality of subgroups defined in the primary-backup group,

9   wherein each subgroup is associated with a resource among the plurality of

10   resources, and wherein each member of each subgroup has access to the resource

11   with which such subgroup is associated.

1   10. The method of claim 9, wherein determining to which of the plurality of

2 resources the joining member has access includes determining to which of the plurality of

3 resources the joining member is capable of hosting.

1   11. The method of claim 9, wherein determining to which of the plurality of

2 resources the joining member has access includes accessing group state information.

1   12. The method of claim 9, wherein adding the joining member to the subgroup

2 includes sending a message to the primary-backup group identifying the subgroup to

3 which the joining member has been added, and whether the joining member is hosting the

4 resource associated with the subgroup.

1   13. The method of claim 9, further comprising, if the joining member is not

2 hosting the resource associated with the subgroup, receiving resource configuration data

3 from another member of the subgroup that is hosting the resource.

1   14. The method of claim 9, further comprising, if the joining member is hosting

2   the resource associated with the subgroup, sending resource configuration data to each

3   other member of the subgroup.

1   15. The method of claim 9, wherein each of the plurality of resources comprises a

2   storage device, the method further comprising, if the joining member is hosting the

3   resource associated with the subgroup, determining whether the resource is the primary

4   resource.

1   16. The method of claim 15, further comprising, if the resource associated with

2   the subgroup to which the joining member is added is determined to not be the primary

3   resource, receiving a message from another member that is hosting the primary resource

4   indicating that mirroring is being initiated from the other member to the joining member.

1   17. The method of claim 15, further comprising, if the resource associated with

2   the subgroup to which the joining member is added is determined to be the primary

3   resource, sending a message from the joining member to another member that is hosting a

4   backup resource indicating that mirroring is being initiated from the joining member to

5   the other member.

1   18. The method of claim 9, wherein each of the plurality of resources comprises a

2   storage device, the method further comprising, if the joining member is hosting the

3   resource associated with the subgroup, synchronizing with at least one other member

4   hosting another resource among the plurality of resources to initiate mirroring from the

5   primary resource to the backup resource.

1   19. The method of claim 9, further comprising adding the joining member to a

2 second subgroup for a second resource among the plurality of resources to which the

3 joining member has access.

1   20. The method of claim 9, wherein the plurality of resources are selected from

2 the group consisting of storage devices and imaging devices.

1 21. A clustered computer system, comprising:

2 primary and backup resources;

3 a plurality of nodes coupled to one another over a network, at least one

4 node having access to the primary resource, and at least one node having access to

5 the backup resource; and

6 program code resident on the plurality of nodes and configured to organize

7 a plurality of members resident on the plurality of nodes into a primary-backup

8 group, the program code configured to organize the plurality of members by

9 forming a primary subgroup including at least one member from the plurality of

10 members and a backup subgroup including at least one member from the plurality

11 of members, wherein each member in the primary subgroup has access to the

12 primary resource, and each member in the backup subgroup has access to the

13 backup resource.

1 22. The clustered computer system of claim 21, wherein the program code is

2 further configured to select a primary host member for the primary resource from the

3 primary subgroup, and select a backup host member for the backup resource from the

4 backup subgroup.

1 23. The clustered computer system of claim 22, wherein the program code is

2 further configured to communicate resource configuration data for the primary resource

3 from the primary host member to any other member of the primary subgroup, and

4 communicate resource configuration data for the backup resource from the backup host

5 member to any other member of the backup subgroup.

6

7 24. The clustered computer system of claim 23, wherein the primary and backup

8 resources each comprise a storage device, and wherein the program code is configured to

9 send a message from the primary host member to the backup host member in connection

10 with initiating mirroring from the primary host member to the backup host member.

1   25. The clustered computer system of claim 21, further comprising a second

2 backup resource, wherein the program code is configured to form a second backup

3 subgroup including at least one member from the plurality of members, wherein each

4 member in the second backup subgroup has access to the second backup resource.

1   26. The clustered computer system of claim 21, wherein each of the primary and

2 backup resources is selected from the group consisting of storage devices and imaging

3 devices.

1   27. An apparatus, comprising:

2   a memory;

3   at least one processor; and

4   program code resident in the memory and configured for execution on the

5   at least one processor, the program code configured to join a member to a

6   primary-backup group in a clustered computer system by determining to which of

7   a plurality of resources managed by the primary-backup group the joining member

8   has access, and adding the joining member to a subgroup for a resource among the

9   plurality of resources to which the joining member has access, wherein the

10   plurality of resources includes a primary resource and at least one backup

11   resource, wherein the subgroup is among a plurality of subgroups defined in the

12   primary-backup group, wherein each subgroup is associated with a resource

13   among the plurality of resources, and wherein each member of each subgroup has

14   access to the resource with which such subgroup is associated.

1   28. The apparatus of claim 27, wherein the program code is configured to

2   determine to which of the plurality of resources the joining member has access by

3   determining to which of the plurality of resources the joining member is capable of

4   hosting.

1   29. The apparatus of claim 27, wherein the program code is configured to add the

2   joining member to the subgroup by sending a message to the primary-backup group

3   identifying the subgroup to which the joining member has been added, and whether the

4   joining member is hosting the resource associated with the subgroup.

1   30. The apparatus of claim 27, wherein the program code is further configured to

2   send resource configuration data to each other member of the subgroup if the joining

3   member is hosting the resource associated with the subgroup.

1   31. The apparatus of claim 27, wherein each of the plurality of resources

2   comprises a storage device, and wherein the program code is further configured to

3   determine whether the resource is the primary resource if the joining member is hosting

4   the resource associated with the subgroup.

1   32. The apparatus of claim 31, wherein the program code is further configured to,

2   if the resource associated with the subgroup to which the joining member is added is

3   determined to not be the primary resource, receive a message from another member that

4   is hosting the primary resource indicating that mirroring is being initiated from the other

5   member to the joining member.

1   33. The apparatus of claim 31, wherein the program code is further configured to,

2   if the resource associated with the subgroup to which the joining member is added is

3   determined to be the primary resource, send a message from the joining member to

4   another member that is hosting a backup resource indicating that mirroring is being

5   initiated from the joining member to the other member.

1   34. The apparatus of claim 27, wherein each of the plurality of resources

2   comprises a storage device, wherein the program code is further configured to, if the

3   joining member is hosting the resource associated with the subgroup, synchronize with at

4   least one other member hosting another resource among the plurality of resources to

5   initiate mirroring from the primary resource to the backup resource.

1   35. The apparatus of claim 27, wherein the program code is further configured to

2   add the joining member to a second subgroup for a second resource among the plurality

3   of resources to which the joining member has access.

1   36. The apparatus of claim 27, wherein the plurality of resources are selected

2   from the group consisting of storage devices and imaging devices.

1   37. A program product, comprising:

2   program code configured to join a member to a primary-backup group in a

3   clustered computer system by determining to which of a plurality of resources

4   managed by the primary-backup group the joining member has access, and adding

5   the joining member to a subgroup for a resource among the plurality of resources

6   to which the joining member has access, wherein the plurality of resources

7   includes a primary resource and at least one backup resource, wherein the

8   subgroup is among a plurality of subgroups defined in the primary-backup group,

9   wherein each subgroup is associated with a resource among the plurality of

10   resources, and wherein each member of each subgroup has access to the resource

11   with which such subgroup is associated; and

12   a signal bearing medium bearing the program code.

1   38. The program product of claim 37, wherein the signal bearing medium

2   includes at least one of a recordable and a transmission medium.